

Work Order ID 138130

Monday, October 26, 2015 8:11:24 AM

138130

Page 1

Item ID: D212-664-201TRN Accept ***N900040100*** Setup Start ***NS1***
 Revision ID: ***NS2***
 Item Name: Crosstube Turning Detail
 Start Date: 10/26/2015 Start Qty: 1.00 ***1*** Cust Item ID:
 Required Date: 10/26/2015 Req'd Qty: 1.00 ***1*** Customer:
 Reference:

Approvals: Process Plan: MJS Date: OCT 26 2015 Tooling: _____ Date: _____
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____
 Run Start ***NR1***
 Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr
D212-664-241	Rev E

100 0.00
100 MORI SEIKI CNC LATHE LARGE
 Mori Seiki 0.02
 Mori Seiki CNC Lathe Large
 Memo
 1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA114
 2-Turn first side as per Folio FA114
 3-Blend transition lines only, **do not sand whole tube**:
 FOLIO REV: AA
 DWG REV: E
 *Use mill bastard file, brush file repeatedly with file card.
 **Do not use sandpaper coarser than 320 grit.

110 0.00
110 QC1- Inspection performed by CMM
 QC Memo 0.00
 Quality Control

1 4
 mm
 15/10/29
1 4
 mm
 15/10/29

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :				MRB (QSI042) Approval	
Description Work Order Deviation				Disposition				Completed By	
								Lead hand / Supervisor Approval Verification	
								QC / QA Coordinator Approval	
Root Cause		FAULT CATEGORY							
Environment ☐	No Re-verification ☐	Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐				
Design ☐	Operator ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐				
Doc/Data ☐	Offset/Setup ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐				
Equip/Tooling ☐	Supplier ☐	Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐				
Handling/Pre ☐	Training ☐	Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐				
Material ☐	Use for Testing ☐	Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐				
Internal Transport ☐	Poor Information ☐	Crushing ☐	Countersink ☐	Off-set ☐	Drawing ☐				
Tribal Knowledge ☐	Rushing ☐	Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐				
LOA ☐	Product Improvement ☐	Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐				
Substation ☐	Process Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐				
Past Expiry Date ☐	Manufacturing Process ☐	OTHER : _____							
Misidentified ☐	Past Due ☐								

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120

120

Mori Seiki

Mori Seiki CNC Lathe Large

MORI SEIKI CNC LATHE LARGE

Memo

1-Turn second side as per Folio FA114

2-Blend transition lines only, **do not sand whole tube**:

*Use mill bastard file, brush file repeatedly with file card.

*Do not use sandpaper coarser than 320 grit.

FOLIO REV: AADWG REV: E

3-Remove sand and plugs

4- scribe batch # and part # as per dwg

0.00

0.03

130

130

QC

Quality Control

QC1- Inspection performed by CMM

Memo

0.00

0.00

mmml
15/11/02mmml
15/11/02

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140

QC8- Inspect parts - second check

0.00

140

QC

Memo

0.00

Quality Control

47

9-89

15-11-09

145

0.00

145

Crosstubes

Memo

0.01

Crosstubes

GRIND ONLY TRANSITION LINES SMOOTH LONGITUDE WAY.

TW

15-11-11

150

0.00

150

HandFXtube

Memo

0.01

Hand Finishing Crosstubes

1- PRESSURE WASH X-TUBE INSIDE AND OUT

2- ALODINE AND ACID ETCH X-TUBE INSIDE AND OUT. USE RED
SCOTCH BRITE

TW

15-11-25

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160	QC7-Inspect Chemical Conversion Coat	0.00							
160									
QC	Memo	0.00							
Quality Control									
170	Packaging	0.00							
170									
Packaging	Memo	0.00							
Packaging	Identify and stock in kanban rack Location: <u>15014</u>								
180	QC21- Final Inspection - Work Order Release	0.00							
180									
QC	Memo	0.00							
Quality Control									

ML5 DEC 02 2015

DQA: _____ Date: _____



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Picklist Print

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Parent Item: D212-664-201TRN

D212-664-201TRN

Parent Item Name: Crosstube Turning Detail

Start Date: 10/26/2015

Required Date: 10/26/2015

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A 08-03-06 new issue DD verified by:ec
IPP Rev B 08.04.02 Removed polish EC verified DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6006-129		Manufactured	No			120	Each	52.0000	1	1			

D6006-129

Crosstube Material

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
LG003	34	
103426	2	
107875	18	
107876	13	
75644	1	
SHED	18	
123967	18	

1 mml 15/10/28

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								QC / QA Coordinator Approval																																																							
Root Cause				FAULT CATEGORY																																																											
Environment ☐	Design ☐	Doc/Data ☐	Equip/Tooling ☐	Handling/Pre ☐	Material ☐	Internal Transport ☐	Tribal Knowledge ☐	LOA ☐	Substation ☐	Past Expiry Date ☐	Misidentified ☐	No Re-verification ☐	Operator ☐	Offset/Setup ☐	Supplier ☐	Training ☐	Use for Testing ☐	Poor Information ☐	Rushing ☐	Product Improvement ☐	Process Improvement ☐	Manufacturing Process ☐	Past Due ☐	Pressure/Forced ☐	Bending ☐	Centre Not Concentric ☐	Cracks ☐	Crimp/Kink/Ripple/Wave ☐	Cuffs ☐	Crushing ☐	Heat Treat ☐	Wave/Twist in Tube ☐	Marks/Chatter ☐	Temperature/Cure ☐	Set-up ☐	BOM/Route ☐	Broken/Damage/Defect ☐	Inspection Incomplete/Unqualified ☐	Contamination ☐	Countersink ☐	Cut Too Short ☐	Instructions Incomplete/Unclear ☐	Drill Holes ☐	Power Loss/Surge ☐	Folio/Program ☐	Grain ☐	Weld ☐	Wrong Stock Pulled ☐	Out of Sequence ☐	Off-set ☐	Mislabeled ☐	Fit/Function ☐	Misaligned/off center ☐	Positioned Wrong ☐	Outside Dimensions ☐	Over/Under tolerance ☐	Part Incorrect ☐	Part Lost/Missing ☐	Part Moved ☐	Drawing ☐	Finish ☐	Misread ☐	Turning Sequence ☐
OTHER :																																																															

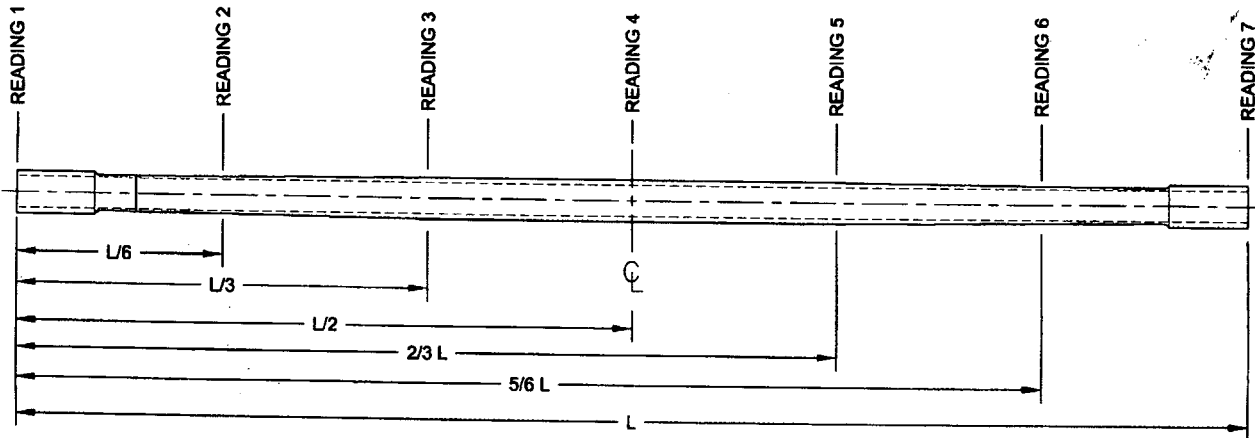
DART AEROSPACE LTD		Work Order:	138130
Description: Crosstube Assembly (205/212 High Aft)		Part Number:	D212-664-241
Inspection Dwg: D212-664-241 Rev: E		Page 1 of 2	

FIRST ARTICLE INSPECTION CHECKLIST

Inspection Sheet Drawing Dimension		Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	0.200	+/-0.010	.200	/		vern	CNC-08
	R0.063	+/-0.010	.063	/		RG	
	2.990	+0.005/-0.000	2.996	/		vern	CNC-08
	5.237	+/-0.030	5.240	/			
	2.600	+0.005/-0.000	2.603	/			
	2.686	+0.005/-0.000	2.687	/			
	2.770	+0.005/-0.000	2.773	/			
	2.854	+0.005/-0.000	2.856	/			
	2.938	+0.005/-0.000	2.939	/			
	3.021	+0.005/-0.000	3.025	/			
	3.133	+0.005/-0.000	3.136	/			
	3.179	+0.005/-0.000	3.182	/			
SIDE B	0.200	+/-0.010	.200	/		vern	CNC-08
	R0.063	+/-0.010	.063	/		RG	
	2.990	+0.005/-0.000	2.991	/		vern	CNC-08
	5.237	+/-0.030	5.240	/			
	2.600	+0.005/-0.000	2.609	/			
	2.686	+0.005/-0.000	2.686	/			
	2.770	+0.005/-0.000	2.774	/			
	2.854	+0.005/-0.000	2.857	/			
	2.938	+0.005/-0.000	2.941	/			
	3.021	+0.005/-0.000	3.025	/			
	3.133	+0.005/-0.000	3.137	/			
	3.179	+0.005/-0.000	3.184	/			
	124.362	+/-0.020	124.362	/		tape	LG-11

DART AEROSPACE LTD		Work Order:	138130
Description: Crosstube Assembly (205/212 High Aft)		Part Number:	D212-664-241
Inspection Dwg: D212-664-241 Rev: E		Page 2 of 2	

WALL THICKNESS MEASUREMENT



Location	WALL THICKNESS MEASUREMENT (IN)				Deviation Δw (max-min)	TOLERANCE
	w1	w2	w3	w4		
READING 1 L= 0"	.397	.392	.397	.405	.013	0.062"
READING 2 L= 21	.325	.315	.320	.328	.013	
READING 3 L= 41	.489	.489	.481	.481	.008	
READING 4 L= 62	.524	.525	.514	.516	.011	
READING 5 L= 83	.483	.488	.493	.491	.010	
READING 6 L= 103	.313	.312	.338	.337	.026	
READING 7 L= 124	.382	.387	.412	.410	.030	

Calibration Result

Actual Block Thickness: 100 - 750
 Sitescan 250 Measured Thickness: 100 - 750

DAS
47

Measured by:	<i>[Signature]</i>
Date:	15/11/02

Audited by:	9-89
Date:	15-11-09

Preliminary Approval:	
Date:	

Rev	Date	Change	Revised by	Approved
A	05.04.27	New Issue (P/O D412-664-201)	KJ/JLM	
B	06.03.09	Tolerance for 5.237 was +/-0.001	KJ/JLM	
C	07.05.08	Dwg Rev. updated	KJ/JLM	
D	10.08.03	Dimension 124.362 was 124.36	KJ	
E	12.06.04	Wall thickness form added	KJ	
F	15.03.03	Dwg Rev updated	KJ	<i>[Signature]</i>

Item	Qty -241	Qty -241B	Part Number	Description
1	X		D212-664-241	CROSSTUBE ASSEMBLY (205/212 HIGH AFT)
2		X	D212-664-241B	CROSSTUBE ASSEMBLY (214 HIGH AFT)
3	1	1	D6006-129	CROSSTUBE
4	2		D2940-1	SUPPORT
5	4	4	D3595-063-530	RUBBER CUSHION
6		2	D5018-1	SUPPORT
7	4	4	MS21920-28	CLAMP (OR MS21920-30)
8	A/R	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6006-129
FINISHED LENGTH = 124.362±0.020
- 2) FINISH: a) CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
b) PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
c) MASK UNDERSIDE OF CROSSTUBE AS SHOWN (ZN C6-2 / C6-3, HATCHED AREA)
d) PAINT OUTSIDE PER DART QSI 005 4.2
e) REMOVE MASKING AND APPLY MATTE CLEAR COAT
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER 'D212-664-XXX' AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: D212-664-241/-241B = 44.2 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

MACHINING

- 10) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.

BENDING

- 11) BEND PROGRESSIVELY WITH A MINIMUM OF 5 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 7.2% (BASED ON O.D.) IN LOWER HALF OF R35.5 BEND AND 6% (BASED ON O.D.) ON REMAINING TUBE.
- 12) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.

ASSEMBLY

- 13) INSTALL D2940-1 / D5018-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 14) INSTALL MS21920-28 CLAMPS (OR -30) WITH D3595-063-530 RUBBER CUSHIONS TO SECURE THE SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE ON TOP SIDE OF CROSSTUBE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

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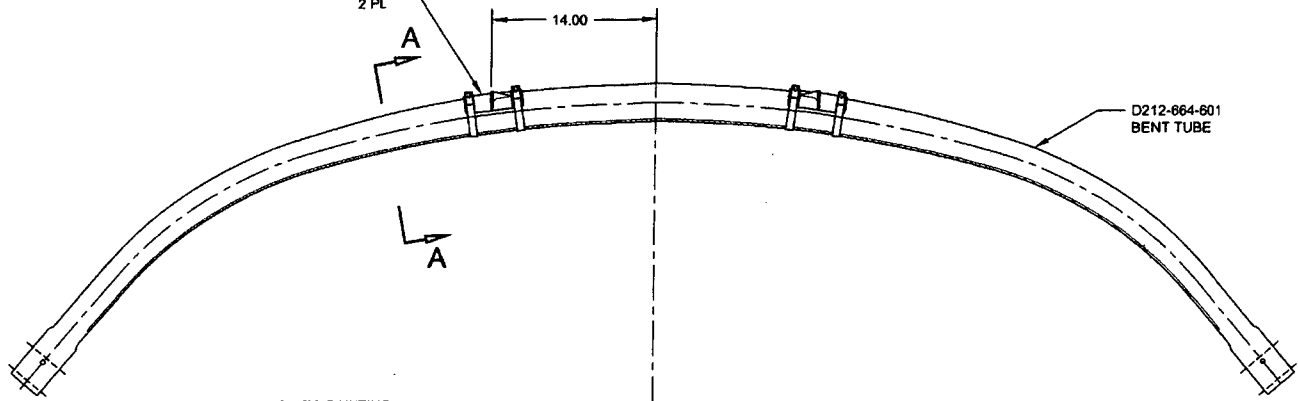
NO. 138130 MLS
1570-26

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2014-05-26

E	D5018-1 WAS D2940-1 (-241B), PROSEAL WAS MAGNOBOND, NOTE 2: ADD INSPECTION WINDOW, NOTE 11: ALLOW 7.2% CRUSH, NOTE 15: ADD 72HR CURE AND RETORQUE FOR PROSEAL, ADD SHEET 3. CLAMPS REVERSED TO PREVENT CHAFING (ZN B7-2, B7-3), BEND HEIGHT TOL. NOW 0.25 WAS 0.13 (C1-4), INCORP DEO D-1/-2	CP	14.04.01
D	REFORMAT/REVISE GENERAL NOTES/PART LIST; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; ADD -241B (ZN D4-2, B4-2); REMOVED REF & ADD TOLERANCES (ZN D8-3 & C4-3, C6-3 & A8-3); RELOCATED FLAG #6 PER PAR 08-046 (ZN A5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4	RF	09.09.30
C	REMOVE -1009 ABRASION STRIP; ADD MAGNOBOND 6398, CUSHION, REVERSE CLAMPS	PH	07.03.08
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	CP	00.12.12
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	14.04.01		
DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA DRAWING NO. D212-664-241 REV. E SHEET 1 OF 5 TITLE CROSSTUBE ASS'Y (205/212 HI AFT) SCALE NTS COPYRIGHT © 2000 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD			

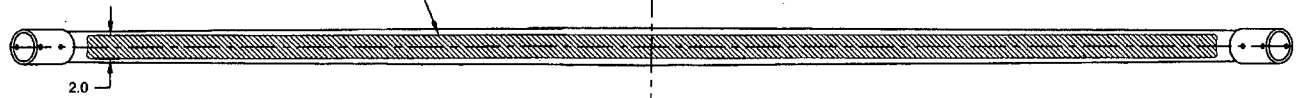
8 7 6 5 4 3 2 1

13 14 15
 D2940-1 SUPPORT
 MS21920-28 CLAMP, 2X
 D3595-063-530 RUBBER CUSHION, 2X
 2 PL



D212-664-601
 BENT TUBE

MASK AREA PRIOR TO PAINTING,
 REMOVE MASKING AFTER PAINT
 AND APPLY CLEAR COAT

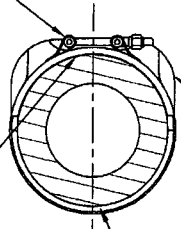


SYM

**D212-664-241
 ASSEMBLY DETAIL**

E MS21920-28
 CLAMP, REF
 14 15

E APPLY PROSEAL
 BETWEEN D2940-1 AND
 CROSSTUBE



D2940-1
 SUPPORT,
 REF

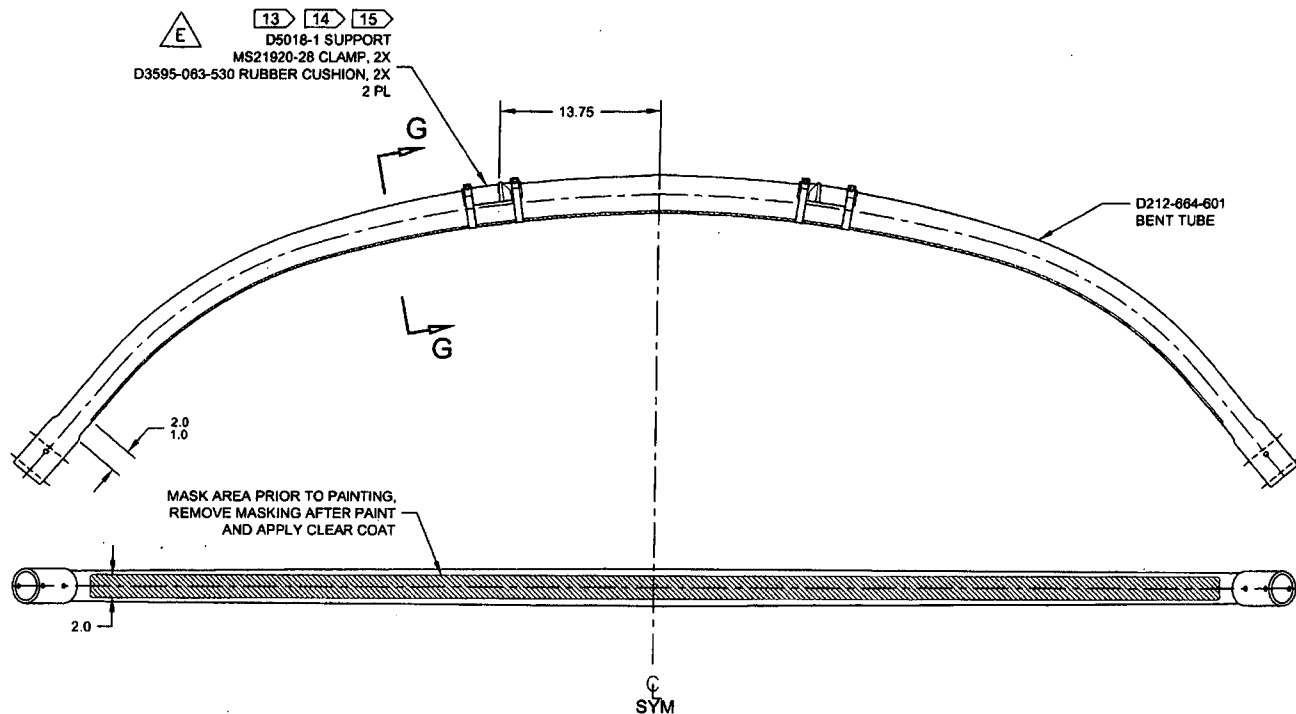
D3595-063-530 RUBBER CUSHION
 UNDER CLAMP, REF

**SECTION A-A
 SCALE 4X**

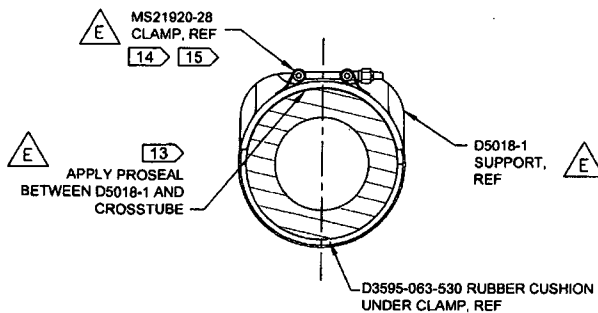
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CHECKED	SL	DRAWING NO.	REV. E
MFG. APPR.	MP	D212-664-241	SHEET 2 OF 5
APPROVED	MP	TITLE	SCALE
DE APPR.	H	CROSSTUBE ASS'Y (205/212 HI AFT)	NTS
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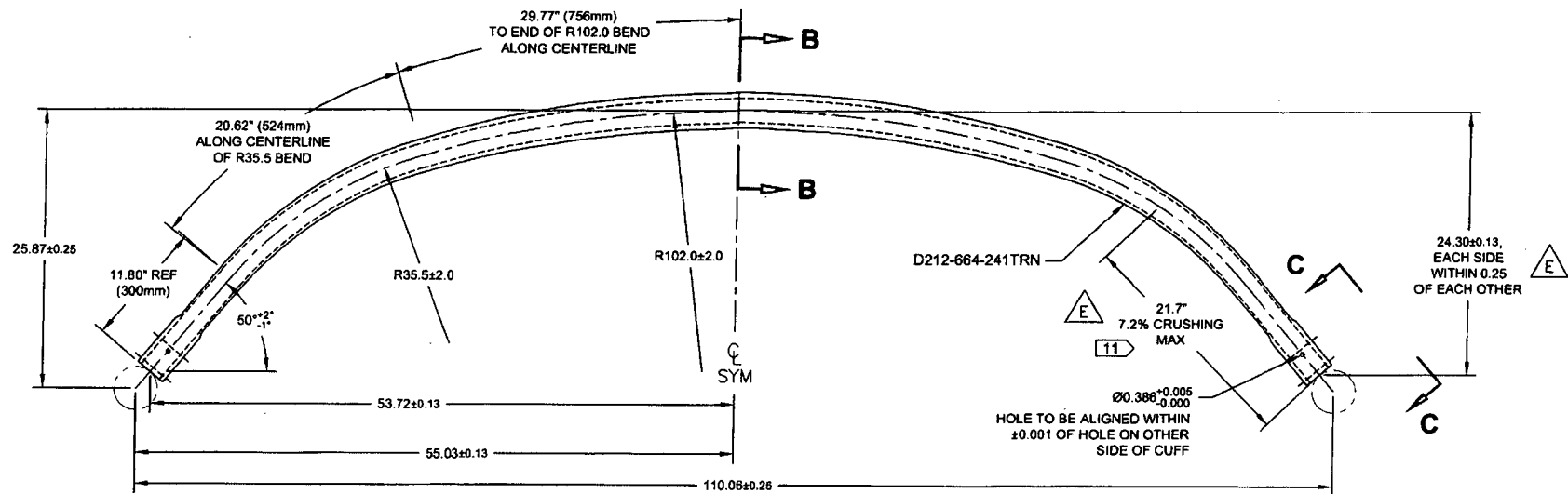
**D212-664-241B
 ASSEMBLY DETAIL**



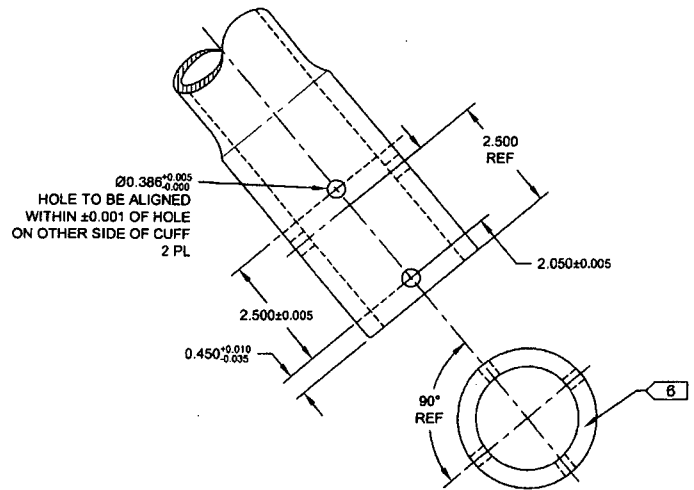
**SECTION G-G
 SCALE 4X**

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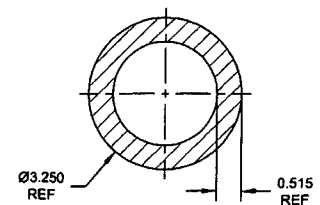
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DRAWN	92	HAWKESBURY, ONTARIO, CANADA	
CHECKED	92	DRAWING NO.	REV. E
MFG. APPR.	92	D212-664-241	SHEET 3 OF 5
APPROVED	92	TITLE	SCALE
DE APPR.	92	CROSSTUBE ASS'Y (205/212 HI AFT)	NTS
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D212-664-601 11
BENDING AND DRILLING DETAIL



VIEW C-C: CUFF DETAIL
 SCALE 3X



SECTION B-B
 SCALE 4X

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DRAWN	<i>Q</i>	HAWKESBURY, ONTARIO, CANADA	
CHECKED	<i>DL</i>	DRAWING NO.	REV. E
MFG. APPR.	<i>DL</i>	D212-664-241	SHEET 4 OF 5
APPROVED	<i>WJD</i>	TITLE	SCALE
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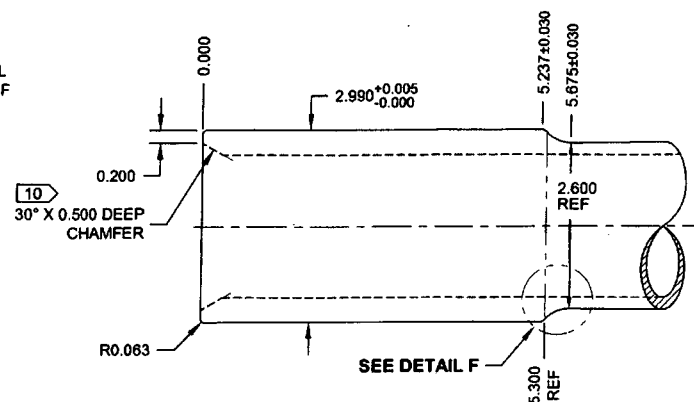


Figure 10 is a circular cross-section diagram of a part. It shows three vertical features. The top dimensions for these features are 3.179, 3.250, and 3.276, each with a tolerance of +0.005 and 0.000. The bottom dimensions are 42.114, 45.042, and 46.114, each labeled with REF. A dashed horizontal line is shown. A callout 'R100.0 REF' points to the left side of the circle. A callout '10 RUN OFF PART' points to the right side of the circle.

DETAIL E:
TAPER RUN-OFF
NOT TO SCALE

RELEASE
2014-05-26

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